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Applicant:	Paul Schliwa-Bertling	§	Group Art Unit:	2475
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Application No:	10/596,782	§	Examiner:	Zhao, Wei
		§		
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For: Method and Device for Controlling a Queue Buffer

Via EFS-Web

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APPEAL UNDER 35 U.S.C. §134

This Appeal Brief is submitted in connection with the decision of the Examiner set forth in a Final Office Action dated December 8, 2010 and an Advisory Action dated February 25, 2011, finally objecting claims 48-51 and 61-64, and finally rejecting claims 33-35, 37-47, 52-55 and 57-60, which are all of the pending claims in this application. The Notice of Appeal was filed March 9, 2011.

The Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §41.20(b)(2) that may be required by this paper, and to credit any overpayment, to Deposit Account No. 50-1379.

Real Party in Interest

The real party in interest, by assignment, is: Telefonaktiebolaget LM Ericsson (publ)
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Stockholm, Sweden

Related Appeals and Interferences

None.

Status of Claims

Claims 33-35, 37-55, and 57-64 are pending in the present application, each of which are finally rejected and form the basis for this Appeal. Claims 33-34, 43-46, 52-54 and 59 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Jeffries (US 2004/0062259) in view of Bird (US 6,657,954). Claims 35, 37-42, 47, 55, 57, 58 and 60 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Jeffries (US 2004/0062259) in view of Bird (US 6,657,954) and further in view of Meyer et al (US 2002/0145976). Claims 48-51 and 61-64 stand objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 33-35, 37-55, and 57-64, including all amendments to the claims thereto are attached in the Claims Appendix. The rejection of claims 33-35, 37-47, 52-55 and 57-60 is appealed.

Status of Amendments

No amendment has been filed subsequent to the Final Rejection dated December 8, 2010. The claims set out in the Claims Appendix include all entered amendments.

Summary of Claimed Subject Matter

Claim Element	Specification Reference
33. A method implemented by a network node for controlling a queue buffer, the queue buffer being connected to a link and being arranged to queue data units of a flow in	Throughout the specification, including: original claim 1, page 11, lines 7-10, and FIG. 1's items 20, 21, 30 and 40.

a queue, comprising the steps of:	
determining a value of a length parameter related to the length of the queue;	Throughout the specification, including: original claim 1, page 7, lines 23-24, and FIG. 2's step S1.
comparing the value with a length threshold value;	Throughout the specification, including: original claim 1, page 8, lines 9-10, and FIG. 2's step S2.
performing a congestion notification procedure if the value is greater than the length threshold value, wherein the congestion notification procedure when performed drops or marks one or more data units;	Throughout the specification, including: original claim 1, page 5, lines 13-22, page 8, lines 10-24, and FIG. 2's step S3.
performing an automatic threshold adaptation procedure, wherein the automatic threshold adaptation procedure comprises a procedure for adjusting the length threshold value on the basis of one or more flow control parameters, wherein the automatic threshold adaptation procedure determines when the congestion notification procedure would be performed to drop or mark one or more of the data units; and	Throughout the specification, including: original claim 1, page 8, lines 15-36, and FIG. 2's step S4.
determining, in a procedure, one or more of the one or more flow control parameters from a flow control parameter introduced by one of a sender and a receiver of the flow queued in the queue.	Throughout the specification, including: original claims 1 and 4, page 8, lines 15-36, and FIG. 2's step S5.

Claim Element	**Specification Reference**
37. The method of claim 35, further comprising the steps of introducing the flow control parameter by the receiver and inserting it into acknowledgment data units sent from the receiver to the sender so as to acknowledge the correct receipt of data units.	Throughout the specification, including: original claim 5, and page 10, lines 8-15.

Claim Element	**Specification Reference**

38. The method of claim 37, wherein the buffer is provided in a network node of a communication network connecting the sender and the receiver, further comprising the step of extracting, in a procedure for determining the flow control parameter, the flow control parameter from the acknowledgement data units at the network node.	Throughout the specification, including: original claim 6, and page 11, lines 12-18.

Claim Element	**Specification Reference**
53. A network node including a queue buffer controller for controlling a queue buffer coupled to a link and arranged to queue data units of a flow in a queue, comprising:	Throughout the specification, including: original claim 24, page 11, lines 7-10, and FIG. 1's items 10, 20, 21, 30 and 40.
a queue length determinator for determining a value of a length parameter related to the length of the queue,	Throughout the specification, including: original claim 24, page 6, lines 26-28, and FIG. 1's item 101.
a comparator for comparing the value with a length threshold value;	Throughout the specification, including: original claim 24, page 6, lines 28-30, and FIG. 1's item 102.
a congestion notifier for performing a congestion notification procedure if the value is greater than the length threshold value, wherein the congestion notification procedure when performed drops or marks one or more data units;	Throughout the specification, including: original claim 24, page 5, lines 13-22, page 6, lines 32-35, and FIG. 1's item 103.
a threshold adaptor for automatically adapting the length threshold value, wherein the threshold adaptor is arranged for adjusting the length threshold value on the basis of one or more flow control parameters, wherein the automatic threshold adaptation procedure determines when the congestion notification procedure would be performed to drop or mark one or more of the data units; and	Throughout the specification, including: original claim 24, page 7, lines 10-13, page 8, lines 15-36, and FIG. 1's item 104.
a flow control parameter determinator for determining one or more of the one or more flow control parameters from a flow control	Throughout the specification, including: original claim 24, page 7, lines 6-9, and FIG. 1's item 105.

parameter introduced by one of a sender and a receiver of the flow queued in the queue.	

Claim Element	Specification Reference
57. The network node of claim 53, further comprising: the flow control parameter being introduced by the receiver and inserted into acknowledgment data units sent from the receiver to the sender for acknowledging the correct receipt of data units, the queue buffer being provided in a network node of a communication network connecting the sender and the receiver, wherein the flow control parameter determinator is arranged for extracting the flow control parameter from the acknowledgement data units at the network node.	Throughout the specification, including: original claim 25, page 10, lines 8-15, and page 11, lines 12-18.

The specification references listed above are provided solely to comply with the USPTO's current regulations regarding appeal briefs. The use of such references should not be interpreted to limit the scope of the claims to such references, nor to limit the scope of the claimed invention in any manner.

Grounds of Rejection to be Reviewed on Appeal

A. Issue 1

The first issue presented for this appeal is whether the independent claims 33 and 53 have been properly rejected under 35 U.S.C. §103(a) as being unpatentable over Jeffries (US 2004/0062259) in view of Bird (US 6,657,954). The rejection of the dependent claims 34-35, 40-47, 52, 54-55, and 58-60 stand or fall with the independent claims 33 and 53.

B. Issue 2

The second issue presented for this appeal is whether the dependent claims 37, 38 and 57 have been properly rejected under 35 U.S.C. § 103(a) as being unpatentable over Jeffries (US 2004/0062259) in view of Bird (US 6,657,954) and further in view of Meyer et al (US 2002/0145976). The rejection of the dependent claim 39 stands or falls with the dependent claim 38.

Argument

A. The independent claims 33 and 53 are not obvious in view of Jeffries and Bird under 35 U.S.C. 103(a)

Applicant respectfully traverses the obviousness rejection of the pending independent claim 33 in view of Jeffries and Bird. The pending independent claim 33 recites the following:

> 33. A method implemented by a network node for controlling a queue buffer, the queue buffer being connected to a link and being arranged to queue data units of a flow in a queue, comprising the steps of:
>
> determining a value of a length parameter related to the length of the queue;
>
> comparing the value with a length threshold value;
>
> performing a congestion notification procedure if the value is greater than the length threshold value, wherein the congestion notification procedure when performed drops or marks one or more data units;
>
> performing an automatic threshold adaptation procedure, wherein the automatic threshold adaptation procedure comprises a procedure for adjusting the length threshold value on the basis of one or more flow control parameters, wherein the automatic threshold adaptation procedure determines when the congestion notification procedure would be performed to drop or mark one or more of the data units; and
>
> determining, in a procedure, one or more of the one or more flow control parameters from a flow control parameter introduced by one of a sender and a receiver of the flow queued in the queue (emphasis added).

The Examiner has noted that the closest prior art Jeffries disclosed the following:

> Congestion notifications are generated by core nodes using a queue-length thresholding technique based on a modified form of the RED (Random Early

Detection) system. RED is an active queue management technique wherein an average queue length is compared with a minimum and a maximum threshold. For average queue lengths above the maximum threshold all packets are dropped. For average queue lengths between the two thresholds packets are randomly transmitted into the queue with a transmit probability dependent on the average queue length.

(see Final Office Action's pages 3 and 16 and Jeffries's paragraph [0004] lines 21-31)

The Examiner was correct when indicated that Jeffries teaches the claimed first determining step, the claimed comparing step, and the claimed first performing step. In addition, the Examiner was correct when indicated that Jeffries fails to teach the highlighted steps: performing an automatic threshold adaptation procedure, wherein the automatic threshold adaptation procedure comprises a procedure for adjusting the length threshold value on the basis of one or more flow control parameters, wherein the automatic threshold adaptation procedure determines when the congestion notification procedure would be performed to drop or mark one or more of the data units; and determining, in a procedure, one or more of the one or more flow control parameters from a flow control parameter introduced by one of a sender and a receiver of the flow queued in the queue.

In an attempt to correct Jeffries's deficiencies, the Examiner cited Bird and stated "Bird et al. from the same or similar field of endeavor teach implementing fairness of the method, performing an automatic threshold adaptation procedure, wherein the automatic threshold adaptation procedure comprises a procedure for adjusting the length threshold value on a basis of one or more flow control parameters (column [6] lines 39-52), wherein the automatic threshold adaptation procedure determines when the congestion notification procedure would be performed to drop one of the data units (column [7] lines 14-21); and determining, in a procedure, one or more of the one or more flow control parameters from a flow control parameter introduced by one of a sender and a receiver of the flow queued in the queue (column [6] lines 39-52) (see

Final Office Action's pages 3-4). The relevant sections of Bird have been provided below as follows:

> The techniques of the present invention monitor indicators of network conditions at a receiver component. When specific conditions are detected, the receiver adapts its threshold according to algorithms defined herein. As stated previously, a threshold is a value used by a receiver to determine whether the sender needs to increase or decrease the rate at which it puts data traffic into the network. The receiver compares an accumulated delay change sum (see FIG. 3) to the threshold value, and uses the result to respond to the sender's request for flow control feedback. Prior art receiver thresholds used static values. The dynamic threshold adaptation of the present invention enables the receiver to more accurately respond to the sender's requests for feedback. The sender can then use this more-accurate feedback to make adjustments to the transmission rate that result in more immediate reaction to network conditions than was possible with prior art techniques. The present invention applies to the monitoring of conditions, and threshold adaptation performed in response to these conditions, that are performed by the receiver. Actions taken by the sender are outside the scope of this invention.
>
> (see col. 6, lines 39-59)

> Techniques for monitoring three specific indicators of network conditions are defined herein. Each of these techniques may be used separately, or they may be used in combination. Using these techniques provides for self-calibration of the receiver threshold, without the need for a user to make threshold adjustments. This self-calibration is useful for dynamically detecting, and quickly responding to, unexpected conditions in the network. For example, the threshold may have been set incorrectly originally, based upon incorrect predictions about such things as network load, link speed, etc. Or, bandwidth may have been added after the threshold was originally set, so that the original setting was correct at the time but no longer is appropriate for the current capacity. The present invention also detects a sender that is just "ramping up", i.e. just beginning to send data, and allows the sender to come up to speed very quickly. This situation is detected by a first monitor that keeps track of the percentage of "increase" messages sent over a recent interval. This monitor also detects the presence or absence of congestion in the network, and adjusts the threshold in response. A higher threshold is used when the network is not congested, so that more increase messages will be sent to the sender, requesting the sender to increase its transmission rate. Conversely, the threshold is lowered when congestion is detected, so that the sender will decrease the transmission rate.
>
> (see col. 6, line 62 through col. 7, line 21)

The Examiner interpreted Bird in relation to the pending independent claim 33 as follows:

> The prior art further teach the techniques to monitor indicators of network conditions at a receiver component. **When specific conditions are detected, the receiver adapts its threshold according to algorithms** defined herein. As stated previously, a **threshold is a value used by a receiver to determine whether the sender needs to increase or decrease the rate at which it puts data traffic into the network (Examiner's Notes: the "receiver" as an element in the network has the same function as "network node" in the instant application**). The receiver compares an accumulated delay change sum (see FIG. 3) to the threshold value, and uses the result to respond to the sender's request for flow control feedback. Prior art receiver thresholds used static values. The dynamic threshold adaptation of the present invention enables the receiver to more accurately respond to the sender's requests for feedback (column [6] lines 39-52, Bird et al.). **This monitor also detects the presence or absence of congestion in the network, and adjusts the threshold in response.** A higher threshold is used when the network is congested, so that more increase messages will be sent to the sender, requesting the sender to increase its transmission rate. Conversely, the threshold is lowered when congestion is detected, so that the sender will decrease the transmission rate **(Examiner's Notes: this feature teaches the same functions "determining, in a procedure, one or more of the one or more flow control parameters from a flow control parameter introduced by one of a sender and a receiver of the flow queued in the queue" as described in the instant application)** (column [7] lines 14-21, Bird et al.)
>
> (see Final Office Action's pages 16-17).

Thus, the Examiner interpreted Bird's receiver to be the same as the claimed network node. However, even assuming this interpretation is correct Bird's receiver still adjusts a threshold used to determine whether the sender needs to increase/decrease the transmission rate at which it puts data traffic into the network (col. 6, lines 42-44). In contrast, the claimed network node adjusts the length threshold value associated with a queue. In other words, Bird's receiver adjusts a threshold but this threshold has no relation whatsoever to the receiver's queue but instead relates to the presence or absence of congestion in a network (col. 7, lines 14-17). Hence, Bird does not correct Jeffries deficiency with respect to the claimed "performing an automatic threshold

adaptation procedure, wherein the automatic threshold adaptation procedure comprises a procedure for adjusting the length threshold value on the basis of one or more flow control parameters, wherein the automatic threshold adaptation procedure determines when the congestion notification procedure would be performed to drop or mark one or more of the data units (emphasis added).

Furthermore, since Bird fails to teach the claimed "adjusting the length threshold value" it follows that Bird would also fail to teach the claimed "adjusting the length threshold value on the basis of one or more flow control parameters ... where the one or more flow control parameters are determined from a flow control parameter introduced by one of a sender and a receiver of the flow queued in the queue". This is indeed the case. In this regard, the Examiner stated that Bird's **"monitor also detects the presence or absence of congestion in the network, and adjusts the threshold in response.** A higher threshold is used when the network is congested, so that more increase messages will be sent to the sender, requesting the sender to increase its transmission rate. Conversely, the threshold is lowered when congestion is detected, so that the sender will decrease the transmission rate **(Examiner's Notes: this feature teaches the same functions "determining, in a procedure, one or more of the one or more flow control parameters from a flow control parameter introduced by one of a sender and a receiver of the flow queued in the queue" as described in the instant application)** (column [7] lines 14-21, Bird et al.)(see Final Office Action's pages 16-17). The Examiner is mistaken. Bird's monitor detecting the presence or absence of congestion in the network is not the same or even related to the broadest possible interpretation of the claimed flow control parameter which is determined from a flow control parameter introduced by one of the sender and receiver of the flow queued in the queue. In particular, the claimed flow control parameter is clearly a parameter that is used to control the flow and which the claimed flow control parameter is introduced by one of the sender and receiver. This is not the same as Bird's monitor detecting the presence or absence of congestion in the network. Furthermore, Applicant directs the

Board's attention to the pending dependent claims 34-35, 37-45 which recite exemplary flow control parameters.

Moreover, since Bird fails to teach the claimed "adjusting the length threshold value" it follows that Bird would also fail to teach the claimed "performing an automatic threshold adaptation procedure ... which comprises a procedure for adjusting the length threshold value ... wherein the automatic threshold adaptation procedure determines when the congestion notification procedure would be performed to drop or mark one or more of the data units". This is indeed the case. Bird's monitor detects the presence or absence of congestion in the network so the receiver can determine whether the sender needs to increase/decrease the transmission rate at which it puts data traffic into the network. Thus, Bird's sender does not "drop" data traffic nor does it make sense for Bird's receiver to request that the sender "drop" data traffic no matter how much congestion the network is currently experiencing. Plus, there is no disclosure where Bird's sender "marks" data traffic. In view of at least the foregoing, Jeffries and Bird fail to disclose or teach all of the limitations that are recited in the pending independent claim 33. Hence, the Applicant respectfully requests the allowance of the pending independent claim 33 and the corresponding dependent claims 34-35 and 37-52.

In addition, the Examiner has repeatedly failed to respond to the Applicant's argument in the previously filed amendment (dated February 16, 2010) and the previously filed Request for Reconsideration (dated February 8, 2011) where the Applicant traversed the Examiner's motivation for combining Jeffries and Bird to reject the pending independent claim 33. In particular, Applicant contended that even if Jeffries and Bird teached all of the claimed limitations, which they do not, there is no motivation to combine Jeffries and Bird to reject the claimed invention. In this regard, the Examiner combined Jeffries and Bird and stated the following:

> "Thus, it would have been obvious to one of ordinary skill in the art to implement the method of Bird et al. in the system of Jeffries et al. The method of Jeffries et al. can be implemented on any type of the method performing an automatic threshold adaptation procedure, wherein the automatic threshold adaptation procedure comprises a procedure for

adjusting the length threshold value on the basis of one or more flow control parameters, wherein the automatic threshold adaptation procedure determines when the congestion notification procedure would be performed to drop one of the data units; and determining, in a procedure, one or more of the one or more flow control parameters from a flow control parameter introduced by one of a sender and a receiver of the flow queued in the queue, which is taught by Bird et al. **The motivation for using the method of Jeffries et al. on performing an automatic threshold adaptation procedure**, wherein the automatic threshold adaptation procedure comprises a procedure for adjusting the length threshold value on the basis of one or more flow control parameters, wherein the automatic threshold adaptation procedure determines when the congestion notification procedure would be performed to drop one of the data units; and determining, in a procedure, one or more of the one or more flow control parameters from a flow control parameter introduced by one of a sender and a receiver of the flow queued in the queue, **is to enhance the efficient way for flow control**.

(see page 4 of the Final Office Action)(emphasis added)

However, Applicant respectfully submits that this is not a proper suggestion for combining Jeffries and Bird. Applicant wishes to remind the Examiner of the basic legal principles for rejecting a claim under 35 U.S.C.§103. Specifically, in In re Rouffet, 47 U.S.P.Q.2d 1453 (Fed. Cir. 1998) the Federal Circuit explained:

> To reject claims in an application under section 103, an examiner must show an unrebutted prima facie case of obviousness. In the absence of a proper prima facie case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent.

Id. at 1455 (citations omitted and emphasis added).

In the Rouffet case, the Examiner had rejected the pending claims on a combination of references. The Board sustained the Examiner. However, the Federal Circuit reversed the Board's decision and ruled that the Examiner's rejections were legally impermissible because they failed to demonstrate a suggestion for combining the

references in the manner proposed by the Examiner. As explained by the Federal Circuit:

> As this court has stated, "virtually all [inventions] are combinations of old elements." Therefore, an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to **show** a motivation to combine the references that create the case of obviousness.

Id. at 1457-58 (citations omitted and emphasis added).

These principles have not been followed in rejecting the pending independent claim 33. Because, by merely stating that there is a motivation to combine the references in order to "enhance the efficient way for flow control" as was done to reject the pending independent claim 33 is not the same as "show[ing] a motivation to combine the references." In particular, the problem with this logic is that it effectively eliminates the requirement of identifying a factual suggestion for combining references from the obviousness analysis. And, since it is a statutory requirement that all inventions have utility, there will also always be an identifiable end or advantage in combining the elements in the prior art in the manner proposed by any claim (e.g., if there was no purpose to an element in a claim it would not be included in the claimed apparatus, after all, who would pursue a claim with superfluous elements or a claim with no utility?). Therefore, if the "suggestion" requirement of 35 U.S.C. § 103 can be met by merely stating there is desire to "enhance the efficient way for flow control" then the suggestion requirement can always be met and is utterly meaningless. Simply put, there is *always* an advantage associated with improving a method that can be meet by combining old elements which can be identified through hindsight *once that combination is known*. Accordingly, Applicant respectfully submits that the §103 rejection of the

pending independent claim 33 be withdrawn because the Examiner failed to identify a legally proper suggestion for combining Jeffries and Bird.

In summary, Applicant respectfully submits that Jeffries and Bird fail to disclose all of the limitations recited in the pending independent claim 33. Furthermore, Applicant respectfully submits that the Examiner failed to identify a legally proper suggestion for combining Jeffries and Bird to reject the pending independent claim 33. The secondary prior art Meyer does not cure the aforementioned deficiencies of Jeffries and Bird. In view of at least the foregoing, Applicant respectfully requests the allowance of the pending independent claim 33 and the corresponding dependent claims 34-35 and 37-52.

Referring now to the pending independent claim 53, Applicant respectfully submits that this claim is patentable in view of the cited prior art. The pending independent claim 53 recites the same or similar distinguishing limitations that have been discussed above with respect to the pending independent claim 33. As such, the aforementioned remarks regarding the patentability of the pending independent claim 33 apply as well to the pending independent claim 53. Accordingly, Applicant respectfully requests the allowance of the pending independent claim 53 and the corresponding dependent claims 54-55 and 57-64.

B. The dependent claims 37, 38 and 57 are not obvious in view of Jeffries, Bird and Meyer under 35 U.S.C. 103(a)

Applicant respectfully traverses the obviousness rejection of the pending dependent claim 37 in view of Jeffries, Bird and Meyer. The pending dependent claim 37 recites the following:

> 37. The method of claim 35, further comprising the steps of introducing the flow control parameter by the receiver and inserting it into

acknowledgment data units sent from the receiver to the sender so as to acknowledge the correct receipt of data units.

In rejecting this claim, the Examiner stated "Jeffries et al. and Bird et al. teach all the subject matter with the exception of implementing the flow control parameters. Meyer et al. from the same or similar field of endeavor teach implementing fairness of the method, further comprising the steps of introducing the flow control parameter by the receiver and inserting it into acknowledgement data units sent from the receiver to the sender so as to acknowledge the correct receipt of data units (paragraph [0016] lines 1-12)(see Final Office Action's pages 6-7)". In particular, Meyer discloses the following:

> [0016] It may be noted that the present invention can be implemented in connection with any type of flow control, as long as the communication protocol with which the segments are being sent provides the above described acknowledgement mechanism according to which an acknowledgement message indicates the correct receipt of a data segment and identifies the last correctly received data segment of the sequence that was received in the proper order of the sequence, and the mechanism that a segment is retransmitted if a threshold number of acknowledgement messages identifying the same data segment are received by the sending peer.

Applicant respectfully submits that Meyer teaches where a receiver sends an acknowledgement message which indicates that correct receipt of a data segment and identifies the last correctly received data segment of the sequence that was receive in the proper order of the sequence but does not teach as claimed where a receiver inserts "a flow control parameter" into acknowledgment data units. In particular, the "flow control parameter" is used to adjust the "length threshold value" which is used to determine when to perform the "congestion notification procedure". Meyer's acknowledgment message does not contain any such "flow control parameter". Accordingly, the Applicant respectfully requests the allowance of the currently pending dependent claim 37.

Applicant respectfully traverses the obviousness rejection of the pending

dependent claim 38 in view of Jeffries, Bird and Meyer. The pending dependent claim 38 recites the following:

> 38. The method of claim 37, wherein the buffer is provided in a network node of a communication network connecting the sender and the receiver, further comprising the step of extracting, in a procedure for determining the flow control parameter, the flow control parameter from the acknowledgement data units at the network node.

In rejecting this claim, the Examiner stated "Jeffries et al. teach the method, wherein the buffer is provided in a network node of a communication network connecting the sender and the receiver (paragraph [0023] lines 1-6), further comprising the step of extracting, in a procedure for determining the flow control parameter, the flow control parameter from the acknowledgment data units at the network node (paragraph [005] lines 1-8)(see Final Office Action's page 7)". In particular, Jeffries discloses the following:

> [0023] Another aspect of the invention provides a network device for processing data packets in a communications network, the device comprising a resource associated with a queue of data packets, and an apparatus for managing the data packet queue in accordance with the bandwidth-feedback mechanism as described herein. Another aspect of the invention provides a data communications network including one or more such devices. A further aspect of the invention provides a computer program product for causing a processor of a network device to perform a queue management method as herein described.
>
> [0005] Common to all the above systems employing bandwidth feedback is that the feedback signal is based on average queue length, and this is then used directly to determine packet drop rates. While average queue length provides a useful indication of congestion status, using this directly to determine drop rates makes it difficult for network administrators to determine the correct parameter settings for operation of real networks. For example, finding the correct parameter settings where different groups of network users are offered different service levels, and for any combination of offered loads, is problematical. Moreover, in the above systems, feedback-dependent decisions on whether to transmit packets into a queue are made on a per-packet basis, requiring a significant amount of complex computation for each packet. Accordingly, it would be desirable to provide an active queue management system which alleviates some or all of the disadvantages with the above systems.

In view of the cited text, Applicant respectfully submits that Jeffries fails to disclose or suggest the claimed network node which extracts anything let alone a flow control parameter from the acknowledgement data units which are received from the receiver. Accordingly, the Applicant respectfully requests the allowance of the currently pending dependent claim 38.

Referring now to the pending dependent claim 57, Applicant respectfully submits that this claim is patentable in view of the cited prior art. The pending dependent claim 57 recites the same or similar distinguishing limitations that have been discussed above with respect to the pending dependent claims 37 and 38. As such, the aforementioned remarks regarding the patentability of the pending dependent claims 37 and 38 apply as well to the pending dependent claim 57. Accordingly, Applicant respectfully requests the allowance of the pending dependent claim 57.

CONCLUSION

The claims currently pending in the application are patentable over the cited prior art, and the Applicants request that the Examiner's rejection thereof be reversed and the application be allowed.

Respectfully submitted,

/William J. Tucker/

Date: June 3, 2011

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CLAIMS APPENDIX

1. - 32. (Cancelled)

33. (Rejected) A method implemented by a network node for controlling a queue buffer, the queue buffer being connected to a link and being arranged to queue data units of a flow in a queue, comprising the steps of:

determining a value of a length parameter related to the length of the queue;

comparing the value with a length threshold value;

performing a congestion notification procedure if the value is greater than the length threshold value, wherein the congestion notification procedure when performed drops or marks one or more data units;

performing an automatic threshold adaptation procedure, wherein the automatic threshold adaptation procedure comprises a procedure for adjusting the length threshold value on the basis of one or more flow control parameters, wherein the automatic threshold adaptation procedure determines when the congestion notification procedure would be performed to drop or mark one or more of the data units; and

determining, in a procedure, one or more of the one or more flow control parameters from a flow control parameter introduced by one of a sender and a receiver of the flow queued in the queue.

34. (Rejected) The method of claim 33, wherein the one or more flow control parameters are predetermined values.

35. (Rejected) The method of claim 34, wherein the predetermined values are associated with known flow control procedures for one or both of data unit senders and data unit receivers.

36. (Canceled)

37. (Rejected) The method of claim 35, further comprising the steps of introducing the flow control parameter by the receiver and inserting it into acknowledgment data units sent from the receiver to the sender so as to acknowledge the correct receipt of data units.

38. (Rejected) The method of claim 37, wherein the buffer is provided in a network node of a communication network connecting the sender and the receiver, further comprising the step of extracting, in a procedure for determining the flow control parameter, the flow control parameter from the acknowledgement data units at the network node.

39. (Rejected) The method of claim 37, wherein the buffer is provided in a first network node of a communication network connecting the sender and the receiver, further comprising the steps of:

extracting, in a procedure for determining the flow control parameter, the flow control parameter from the acknowledgement data units at a second network node different from the first network node; and

sending the flow control parameter from the second network node to the first network node.

40. (Rejected) The method of claim 33, further comprising performing a flow control for the flow in a window-based queue, wherein one of the one or more flow control parameters is a control window.

41. (Rejected) The method of claim 40, wherein the control window is introduced by the receiver and expresses a limitation of how many data units the receiver can handle.

42. (Rejected) The method of claim 40, wherein the control window is introduced by the sender and expresses a limitation of how many data units the sender can send.

43. (Rejected) The method of claim 33, further comprising performing a rate-based flow control for the flow in the queue, wherein one of the one or more flow control parameters is a control rate.

44. (Rejected) The method of claim 43, wherein the control rate is introduced by the receiver and expresses a data rate limitation for arriving data units that the receiver can handle.

45. (Rejected) The method of claim 43, wherein the control rate is introduced by the sender and expresses one of a data rate limitation for the rate of data units that the sender can send, a current sending rate and a target sending rate.

46. (Rejected) The method of claim 33, wherein the automatic threshold adaptation procedure further comprises the steps of:

estimating a link capacity value;

analyzing whether the performance of the congestion notification procedure will lead to an underutilization of the link due to a reaction of the sender to the congestion notification under the condition that the length threshold value is set equal to the estimated link capacity value;

and adapting the length threshold value on the basis of a result of the analyzing step by setting the length threshold value equal to the estimated link capacity value if the analyzing step indicates no underutilization; and

setting the length threshold value larger than the estimated link capacity value otherwise.

47. (Rejected) The method of claim 46, wherein the length threshold value is set to a value derived on the basis of one of the flow control parameters if the analyzing step indicates underutilization.

48. (Objected) The method of claim 46, further comprising the steps of:

sending, by a sender of the flow in the queue, the data units in a predetermined sequence;

sending, by a receiver of the flow in the queue, acknowledgment messages for acknowledging the correct receipt of the data units, where each acknowledgment message identifies the last data unit correctly received in the sequence;

sending, by the receiver to the sender, a first window value expressing a limitation of how many data units the receiver can handle;

performing, by the sender, a window-based flow control using a send window, the send window being selected as the minimum of the first window value and a second window value, such that the sender must not send data units with a sequence number higher than the sum of the highest acknowledged sequence number and the send window, and the sender dividing the second window value by two as a reaction to a congestion notification, and thereafter increasing the second window by a predetermined increment for each duplicate acknowledgment message it receives, wherein one of the one or more flow control parameters is the first window value and the length threshold value is initially set equal to the estimated link capacity value, and

setting, by the automatic threshold adaptation procedure, the length threshold value equal to the estimated link capacity value if the first window value is greater than 1.5 times the sum of the estimated link capacity value and the momentary value of the length threshold value.

49. (Objected) The method of claim 48, further comprising the step of setting, by the automatic threshold adaptation procedure, the length threshold value equal to the estimated link capacity value if the first window value is greater or equal to 1.5 times the sum of the estimated link capacity value and the momentary value of the length threshold value.

50. (Objected) The method of claim 49, wherein the length threshold value is set equal to a function of the first window value if the first window value does not fulfill the condition for setting the length threshold value equal to the estimated link capacity value.

51. (Objected) The method of claim 50, wherein the function is the difference between the first window value and a predetermined reduction value.

52. (Rejected) The method of claim 33, as implemented in a computer program product arranged to execute the method on a programmable data processing device connected to a communication network containing the link.

53. (Rejected) A network node including a queue buffer controller for controlling a queue buffer coupled to a link and arranged to queue data units of a flow in a queue, comprising:

a queue length determinator for determining a value of a length parameter related to the length of the queue, a comparator for comparing the value with a length threshold value;

a congestion notifier for performing a congestion notification procedure if the value is greater than the length threshold value, wherein the congestion notification procedure when performed drops or marks one or more data units;

a threshold adaptor for automatically adapting the length threshold value, wherein the threshold adaptor is arranged for adjusting the length threshold value on

the basis of one or more flow control parameters, wherein the automatic threshold adaptation procedure determines when the congestion notification procedure would be performed to drop or mark one or more of the data units; and

a flow control parameter determinator for determining one or more of the one or more flow control parameters from a flow control parameter introduced by one of a sender and a receiver of the flow queued in the queue.

54. (Rejected) The network node of claim 53, wherein the one or more flow control parameters are predetermined values.

55. (Rejected) The network node of claim 54, wherein the predetermined values are stored in the queue buffer controller and associated with known flow control procedures for data unit receivers.

56. (Canceled)

57. (Rejected) The network node of claim 53, further comprising:

the flow control parameter being introduced by the receiver and inserted into acknowledgment data units sent from the receiver to the sender for acknowledging the correct receipt of data units,

the queue buffer being provided in a network node of a communication network connecting the sender and the receiver, wherein the flow control parameter determinator is arranged for extracting the flow control parameter from the acknowledgement data units at the network node.

58. (Rejected) The network node of claim 53, wherein the flow control parameter is introduced by the receiver and inserted into acknowledgment data units sent from the receiver to the sender for acknowledging the correct receipt of data units, and wherein the queue buffer is provided in a first network node of a communication network

connecting the sender and the receiver, wherein the flow control parameter determinator is arranged for receiving the flow control parameter from a second network node at which the flow control parameter was extracted.

59. (Rejected) The network node of claim 58, wherein the threshold adaptor further comprises:

an estimator for estimating a link capacity value;

an analyzer for analyzing whether the performance of the congestion notification procedure will lead to an underutilization of the link due to a reaction of the sender to the congestion notification under the condition that the length threshold value is set equal to the estimated link capacity value; and

an adaptor for adapting the length threshold value on the basis of a result of the analyzing step by setting the length threshold value equal to the estimated link capacity value if the analyzing step indicates no underutilization, and setting the length threshold value larger than the estimated link capacity value otherwise.

60. (Rejected) The network node of claim 59, wherein the threshold adaptor is arranged to set the length threshold value to a value derived on the basis of one of the flow control parameters if the analyzer indicates underutilization.

61. (Objected) The network node of claim 59, further comprising:

the sender of the flow in the queue sends the data units in a predetermined sequence;

the receiver of the flow in the queue sends to the sender acknowledgment messages for acknowledging the correct receipt of the data units, wherein each acknowledgment message identifies the last data unit correctly received in the sequence, and the receiver sends to the sender a first window value expressing a limitation of how many data units the receiver can handle;

the sender performs a window-based flow control using a send window, the send window being selected as the minimum of the first window value and a second window value, such that the sender must not send data units with a sequence number higher than the sum of the highest acknowledged sequence number and the send window;

the sender further divides the second window value by two as a reaction to a congestion notification, and thereafter increase the second window by a predetermined increment for each duplicate acknowledgment message it receives, wherein one of the one or more flow control parameters is the first window value; and

the threshold adaptor arranged to initially set the length threshold value equal to the estimated link capacity value, and to set the length threshold value equal to the estimated link capacity value if the first window value is greater than 1.5 times the sum of the estimated link capacity value and the momentary value of the length threshold value.

62. (Objected) The network node of claim 61, wherein the threshold adaptor is arranged for setting the length threshold value equal to the estimated link capacity value if the first window value is greater or equal to 1.5 times the sum of the estimated link capacity value and the momentary value of the length threshold value.

63. (Objected) The network node of claim 62, wherein the threshold adaptor is arranged to set the length threshold value equal to a function of the first window value if the first window value does not fulfill the condition for setting the length threshold value equal to the estimated link capacity value.

64. (Objected) The network node of claim 63, wherein the function is the difference between the first window value and a predetermined reduction value.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.